Topic: Marginal cost, revenue and profit

Question: Find weekly marginal cost.

A balloon company has weekly cost described by $C(x) = 1.5x + 300$. What is its weekly marginal cost?

Answer choices:

A $1.00

B $1.50

C $1.05

D $300

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Solution: B

Marginal cost is a measure of cost over time. We can find marginal cost by taking the derivative of the cost formula.

$$C(x) = 1.5x + 300$$

$$C'(x) = 1.5$$

The balloon company's weekly marginal cost is $\$1.50$.

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Topic: Marginal cost, revenue and profit

Question: Find the number of units that maximize weekly revenue.

A candy company has weekly revenue described by $R(x) = -0.52x^2 + 12x$, where x represents a single unit. How many units need to be sold to maximize weekly revenue?

Answer choices:

A 12

B 44

C 23

D 32

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Solution: A

Marginal revenue is a measure of revenue over time. We can find marginal revenue by taking the derivative of the revenue formula.

To find marginal revenue, we'll take the derivative of our revenue formula.

$$R(x) = -0.52x^2 + 12x$$

$$R'(x) = -1.04x + 12$$

To maximize revenue we'll set the marginal revenue equal to zero and solve for x.

$$-1.04x + 12 = 0$$

$$-1.04x = -12$$

$$x = 11.5$$

Since we can't have a partial unit, we can round our answer to the nearest whole number and we'll get $x = 12$.

The candy company needs to sell 12 units to maximize weekly revenue.

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Topic: Marginal cost, revenue and profit

Question: Find marginal profit.

The cell phone store has monthly costs described by $C(x) = 22.5x + 675$ and monthly revenue described by $R(x) = 0.89x^2 - 22x$. What is the marginal profit if the store sells $1{,}000$ units in one month?

Answer choices:

A $\$1{,}753.50$

B $\$844{,}825.00$

C $\$1{,}735.50$

D $\$846{,}175.00$

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Solution: C

Marginal profit is a measure of profit over time. We can find a function for marginal profit by taking the derivative of the profit formula, and we can create the profit formula by subtracting cost from revenue.

We'll start by creating the profit formula, which we'll do by subtracting cost from revenue. Since cost is given by $C(x) = 22.5x + 675$ and revenue is given by $R(x) = 0.89x^2 - 22x$, profit is given by

$$P(x) = 0.89x^2 - 22x - (22.5x + 675)$$

$$P(x) = 0.89x^2 - 44.5x - 675$$

To find marginal profit, we'll take the derivative of the profit function.

$$P'(x) = 1.78x - 44.5$$

Now we can find marginal profit when the stores sells $1{,}000$ units by evaluating the marginal profit function at $x = 1{,}000$.

$$P'(1{,}000) = 1.78(1{,}000) - 44.5$$

$$P'(1{,}000) = 1{,}735.5$$

The monthly marginal profit is $\$1735.50$.

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